REMARKS

The Examiner is thanked for his careful and very thorough Office Action.

Claims 1-7 have been rejected.

Note that the amendments to Claims 1, 4, and 5 are intended to be purely formal amendments, and are believed not to change the scope of these claims.

Claims 8-26 have been added. Support for Claims 8-26 is essentially the same as that for Claims 1-7, but the added claims are directed to methods and systems for computer graphics system operation according to the disclosure of the application as filed. The support for Claims 8, 10, 15, and 20 can be found, for example, in paragraph [0011]. The support for Claims 9, 11, 12, 16, 21, and 26 can be found, for example, in paragraph [0189]. The support for Claim 13 can be found, for example, in paragraph [0227]. The support for Claims 14, 18, and 19 can be found, for example, in the abstract. The support for Claim 17 can be found, for example, in paragraph [0228]. The support for Claims 22 and 23 can be found, for example, in paragraph [0229]. The support for Claims 24 and 25 can be found, for example, in paragraph [0230]. The new claims are respectfully asserted not to introduce new matter, and their entry is respectfully requested.

The foregoing amendments to the specification are submitted to improve clarity, and to remove various typographical and other minor informalities. These changes are respectfully asserted not to introduce new matter, and their entry is respectfully requested.

Art Rejections

The art rejections are all respectfully traversed.

Review of the References

Bong (U.S. Patent No. 6,377,265) relates to digital differential analyzer (DDA) with parallel processing paths. This patent does not disclose or suggest evaluating plane equations on a patch of pixels.

McNamara et al. (U.S. Patent No. 6,329,977) relates to a computer graphics system using improved pre-filtering techniques that minimize aliasing artifacts in the image. This patent does not disclose or suggest a parallelized method for rapidly testing membership of pixels in a fragment.

If the undersigned attorney has overlooked a relevant teaching in any of the references, the Examiner is requested to point out very specifically where such teaching may be found.

Rejection Under 35 USC 103(a)

Claims 1-3 stand rejected under 35 USC Section 103(a) as being unpatentable over *Bong*.

Bong does not support each limitation of Claim 1. Specifically, Claim 1 recites "**evaluating the plane equations at a base location which is not external to the patch; computing plane equation valuation offsets for a plurality of spatial offsets from said base location**".

As correctly noted by the Examiner, *Bong* describes a digital differential analyzer. However, the Examiner's suggestion, that *Bong* describes a method of evaluating the parameters that may include plane equations, is incorrect.

A digital differential analyzer is a mechanical device used for scan converting lines that solves differential equations by numerical methods. It traces out successive (x, y) values by simultaneously incrementing x and y by small steps proportional to the first derivative of x and y. In contrast, the plane equation method utilized by the present application is used to find the equation

of the plane in which a polygon lies. This method uses the coordinates of three vertices to find the plane. Therefore, the DDA method and the plane equation method employ different techniques for different purposes. Accordingly, the Examiner's suggestion that the DDA method of *Bong* may have included plane equations is incorrect.

In fact, not only does *Bong* not disclose or suggest plane equations, it expressly teaches away from using plane equations. As stated in *Bong*:

> *For a pixel located at X_M, Y_N in a triangle (e.g., on the (N+1)th scan line from starting vertex A and (M+1)th pixels from the dominant edge AC of the triangle) the S, T, and Q parameters are determined. An accurate method to calculate the values of the S, T, and Q parameters is to use the (X, Y) coordinate of the fragment and substitute this into a plane equation for each parameter. This method provides an accurate result but is computationally expensive. An alternative method that is less computationally intensive, and also provides a good approximation, linearly interpolates the S, T, and Q values of a fragment at X_M, Y_N.*[1]

A prior art reference may be considered to teach away when:

> **[A] person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.**[2]

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[1] Col. 7, ll. 10-20.

[2] *In re Gurley*, 27 F.3d 551, 553, 31 USPQ 2d 1130, 1131 (Fed. Cir. 1994).

As determined in *Thrift,*[3] a rejection which "does not discuss the unique limitations" of the claims was held to be "simply inadequate on its face." In this case, a rejection was held "not supported by substantial evidence because **the cited references do not support each limitation** of claim 11." See *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1443 (Fed. Cir. 1991)."[4] Therefore, a prima facie case of obviousness has not been established by the Examiner with regard to this claim.

Claim 3 also recites limitations not supported by *Bong*. Specifically, Claim 3 recites "**converting the plane equations to a format in which x and y coordinates are referenced to a base location which is within one patch width from the patch being tested; and computing plane equation valuation offsets for a plurality of spatial offsets from said base location**". As stated above, *Bong* does not disclose or suggest evaluating plane equations on a patch of pixels. Therefore, a prima facie case of obviousness has not been established by the Examiner with regard to this claim.

Accordingly, even if one were somehow properly motivated to apply the DDA method of *Bong* to patches of pixels instead of scan lines (which Applicant strongly disputes), all of the limitations of Claims 1 and 3 still would not be supported by the suggested modification.

Finally, dependent Claim 2 depends directly from independent Claim 1 and incorporates all the limitations thereof.

Therefore, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

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[3] *In re Thrift*, 298 F.3d 1357 (Fed.Cir. 2002).

[4] *In re Thrift*, 298 F.3d at 1366 (emphasis added).

Claims 4-7 stand rejected under 35 USC Section 103(a) as being unpatentable over *McNamara et al.*

McNamara et al. does not support each limitation of Claim 4. Specifically, Claim 4 recites "**(a.) defining half-plane membership functions with reference to a base point which is not outside the fragment; (b.) evaluating said membership functions at a base location which is not external to the patch; and (c.) clamping extreme values of said membership functions**".

McNamara et al. relates to a pre-filtering technique that minimizes aliasing artifacts in the image. This patent discloses placing a plurality of edges near a line in the image. A distance function is then used to determine the distance of selected pixels from each edge in units of pixels. These distances determine the intensity value for each selected pixel.

The Examiner has suggested that *McNamara et al.* describes an edge function that is calculated for a particular pixel, which serves as a base point for the incremental calculation of the edge function for neighboring pixels. However, this is incorrect. *McNamara et al.* does not appear to define half-plane membership functions with reference to a base point nor does it appear to evaluate membership functions at a base location. *McNamara et al.* simply determines the intensity value for selected pixels in terms of their distance from a plurality of edges, not their distance from one another. Accordingly, the intensity value for each selected pixel is determined independent of the other selected pixels.

The Examiner has suggested that it would have been obvious to clamp the extreme values of the edge function because the benefits of incremental computation are lost at higher distances from the base location. However, this is merely a generalized, statistical statement. It is not proper motivation. **In order to support the obviousness conclusion, there must be a showing of a suggestion or motivation to modify the teachings of that reference to the**

claimed invention.[5] Accordingly, the Examiner has failed to establish a proper motivation for the suggested modification.

Even if one were somehow properly motivated to clamp the extreme values of the edge function (which Applicant strongly disputes), as stated earlier, all of the limitations of Claim 4 still would not be supported by the suggested modification. Accordingly, a prima facie case of obviousness has not been established by the Examiner with regard to this claim.

Claim 5 also recites limitations not supported by *McNamara et al.* Specifically, Claim 5 recites "**(a.) defining half-plane membership functions with reference to a base point which is not outside the fragment; (b.) evaluating said membership functions in parallel, for pixels of a patch; and (c.) clamping extreme values of said membership functions**".

As discussed earlier, *McNamara et al.* does not appear to define half-plane membership functions with reference to a base point nor does it appear to evaluate membership functions at a base location. *McNamara et al.* simply determines the intensity value for selected pixels in terms of their distance from a plurality of edges, not their distance from one another. Accordingly, the intensity value for each selected pixel is determined independent of the other selected pixels.

Again, no proper motivation has been provided for clamping the extreme values of the edge function.

The Examiner has suggested that it would have been obvious to apply the edge function to patches of pixels in parallel rather than individual pixels because processes that must compute a large number of small equations will run faster when processed in parallel. However, this is merely a generalized statement regarding parallel processing. It is not proper motivation.

Even if one were somehow properly motivated to apply the edge function of *McNamara et al.* to patches of pixels in parallel rather than

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[5] B.F. Goodrich Co. v. Aircraft Braking Sys. Corp., 72 F.3d at 1582, 37 USPQ2d at 1318 (Fed. Cir. 1996).

individual pixels (which Applicant strongly disputes), as discussed earlier, all of the limitations of Claim 5 still would not be supported by the suggested modification. Accordingly, a prima facie case of obviousness has not been established by the Examiner with regard to this claim.

Finally, dependent Claims 6 and 7, which depend directly from independent Claims 4 and 5 and incorporate all the limitations thereof, also include additional limitations that are not shown or suggested by *McNamara et al.*

Specifically, Claims 6 and 7 both recite "**wherein said clamping step limits dynamic range of said membership functions to less than 10 bits**". As stated earlier, *McNamara et al.* does not disclose or suggest clamping extreme values, much less limiting the dynamic range of the membership functions to less than 10 bits.

Thus, for this reason, and for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

Respectfully submitted,

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